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Original Research Paper

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CASE STUDY ON DIABETIC FOOT-MEDICATED COLLAGEN DRESSING VERSUS CONVENTIONAL DRESSING.

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ABSTRACT

Aims And Objectives: The aim is to evaluate the clinical efficacy of medicated collagen dressing versus conventional dressing, as topical dressing material in diabetic ulcer to promote healing. In terms of:1) Healing time 2)Duration of antibiotics 3)Duration of length of stay in hospital. **Background:** Diabetic foot ulcers are a major source of morbidity, limb loss, and mortality. A prolonged inflammatory response, extracellular matrix degradation irregularities, and increased bacteria presence have all been hypothesized a major contributing factors in the delayed healing of diabetic wounds. Collagen components such as fibroblast and keratinocytes are fundamental to the process of wound healing and skin formation. Wound dressings that contain collagen products create a biological scaffold matrix that supports the regulation of extracellular components and promotes wound healing. **Methods:** The study was conducted in patients admitted with diabetic foot ulcer in SVP hospital, attached to NHL MMC. The no. of patients included in the study was 30, out of which, 15 in Group A- Topical dressing with medicated collagen powder (medicated with metronidazole and mupirocin) were applied with operative/bedside surgical debridement whenever indicated and 15 in Group B- Conventional Topical dressing with operative/bedside surgical debridement. Data was analyzed using appropriate software. **Results:** The results concluded that healing time, duration of antibiotics and duration of stay in hospital were comparatively low in Group A patients then in Group B patients. **Conclusion:** Medicated Collagen powder dressing is safe and effective in the treatment of diabetic foot ulcer and significantly reduces healing time, duration of antibiotic therapy and duration of stay in hospital.

KEYWORDS : Medicated collagen powder, wound healing, diabetic foot ulcer.

INTRODUCTION

Diabetic foot ulcer is a severe and common consequence of diabetes mellitus that considerably increases treatment expenditures. Patients with diabetes have a 12% to 25% lifetime risk of having a foot ulcer[1-3] Diabetic foot ulcers are the major cause of lower leg amputation in patients with diabetes, and surgery is used to treat diabetic foot ulcer progression in 85% of amputation cases[4-5]. During the last decade, various new dressing materials developed, like calcium alginate, hydro-colloid membranes and fine mesh gauze collagen-based biological dressings provide a proper physiological contact between the ulcer and the environment, as well as prevent bacterial infection of the ulcer. Collagen, as a key component of the extracellular matrix, is a vital component of the human body.The present study has been conducted to compare the efficacy of medicated collagen powder dressing with that of conventional dressing materials like povidone iodine,hydrogen peroxide, in the management diabetic foot ulcers.

METHODS

This is prospective, comparative study carried out during the August 2019 to March 2020 in the Department of General Surgery, SVP Hospital, Ahmedabad.

Total 30 patients were included in the study.All patients underwent a standard clinical and laboratory evaluation. Briefly, information about age, known DM duration, smoking habits, arterial blood pressure, and anthropometric measurements was collected, if required initial surgical debridement was done. At the same time swab from an ulcer was taken and sent for culture and sensitivity.

All the patients received antibiotic treatment (oral or parenteral) according to severity of their infections. Smooth control of diabetes was achieved by dietary measures + oral hypoglycemic agents or inj Insulin according to dosage which was regulated by urine sugar, fasting blood sugar and post-prandial blood sugar.

Inclusion Criteria

Age >35 years.
Patients with diabetic foot ulcers.

Exclusion Criteria

Critically ill patients.
Any evidence of underlying bone pathology.

Efficacy evaluation of study was based on appearance of healthy granulation tissue, requirement of antibiotic treatment duration and days of hospitalization. The method of dressing in Group A patients, which was done with medicated collagen powder, the wound was first cleaned with 0.9% normal saline, all the slough or pus wiped out, and bedside debridement done and then medicated collagen powder was filled in the wound and packed with gauze piece with normal saline in it and was packed for 36-48 hours.

The method of dressing in Group B patients, was conventional one and the wound first was cleaned with 0.9% normal saline, all the slough or pus wiped out, and bedside debridement if needed was done, then with the help of betadine and hydrogen peroxide solution it was cleaned and again with saline gauze it was cleaned and then packed.

All the patients were followed up on a regular basis till 12 weeks.

RESULTS AND OBSERVATION

The 30 patients of diabetic foot which required dressing were divided in Group A, 15 patients, which had medicated collagen powder and Group B, 15 patients, which had conventional methods, respectively and were studied. The

results of the study are as follows:

Table 1: Age Distribution.

AGE GROUP (in years)	MEDICATED COLLAGEN POWDER DRESSING GROUP A (15)	CONVENTIONAL DRESSING GROUP B (15)
20-39 YEARS	2(14%)	1(7%)
40-59 YEARS	7(47%)	9(60%)
60-79 YEARS	6(40%)	5(33%)

In both the groups, i.e. Group A and Group B, maximum no. of patients were in the age group of 40-59 years.

All the 30 patients which were included in the study, had undergone surgical debridement.

Table 2: Size Of Ulcer After Initial Surgery

SIZE CM*CM	GROUP A (15 PATIENTS)	GROUP B (15 PATIENTS)
5 to 7 cm	8(54%)	9 (60%)
8-10 cm	4 (27%)	4 (27%)
>10CM	3 (20%)	2 (14%)
AVERAGE SIZE	5 to 7 cm	5 to 7 cm

In both the groups, i.e. Group A and Group B the average ulcer size was found to be same, i.e. 5 to 7 cms.

Table 3: Appearance Of Healthy Granulation Tissue.

DAYS	GROUP A (15 PATIENTS)	GROUP B (15 PATIENTS)
1-10	8(54%)	2(14%)
11-15	3(20%)	6(40%)
16-20	2(14%)	2(14%)
21-25	1(7%)	3(20%)
26-30	1(7%)	2(14%)
AVERAGE DAYS	9 DAYS	15 DAYS

In Group A, 8(54%) patients had the appearance of healthy granulation tissue within 9 days on average, whereas in Group B, average days for appearance of healthy granulation tissue was 15 days.

Table 4: Duration Of Antibiotics Required.

DAYS	GROUP A (15 PATIENTS)	GROUP B (15 PATIENTS)
0-5	7(47%)	5(33%)
6-10	5(33%)	5(33%)
11-15	3(20%)	4(27%)
16-20	0(0%)	1(7%)
AVERAGE DAYS	5(33%)	8(545)

The duration of antibiotics required were determined with the help of wound swab culture, which was sent on a regular basis, and antibiotics were stopped when the 2 consecutive swab culture report came negative.

Average requirement of antibiotics in Group A was found to be 5 days, whereas average requirement of antibiotics in Group B was found to be 8 days.

Table 5: Total Hospital Stay.

DAYS	GROUP A (15 PATIENTS)	GROUP B (15 PATIENTS)
1-10	2(13%)	0(0%)
11-15	8(54%)	3(20%)
16-20	4(27%)	4(27%)
21-25	1(7%)	6(40%)
26-30	0(0%)	2(13%)
AVERAGE DAYS	13	21

The average hospital stay in Group A is 13 days, whereas the average hospital stay in Group B is 21 days.

DISCUSSION

In the present study, we have found an overall benefit of medicated collagen powder on the appearance of healthy granulation tissue compared with conventional dressing.The appearance of healthy granulation was significantly lower in patients receiving medicated collagen powder dressing (9 days) as compared to conventional dressing (15 days).Further, the duration of antibiotics required was significantly lower in medicated collagen powder dressing patients (5 days) as compared to conventional dressing patients (8 days).We also found significantly less total duration of hospital stay in medicated collagen powder treated patients (13 days) as compared to patients receiving conventional dressing (21 days).Our results showed that collagen dressing is effective in promoting complete wound healing in the studied patient population.The analysis indicated that collagen dressing was of greater benefit, compared with conventional dressing, in treating diabetic foot ulcers.

Collagen is a biological substance that aids wound healing by forming and arranging newly produced fibers and granulation tissue in the wound bed, creating an ideal wound healing environment[6] .Collagen granules help angiogenesis and strengthen the body's healing processes when sprinkled over wound [7-8]Collagen dressings have other advantages over conventional dressings in terms of ease of application and being natural, non-immunogenic, non-pyrogenic, hypo-allergenic, and pain free [9-10] The wound healing process involves phenomena such as proliferation, migration, and cell differentiation—all of which are influenced by the presence of collagen. In the final stage of repair with a continuity tissue solution, the maturation of collagen takes place and collagen fibers create a bridge between the edges of the damaged tissues, going on to form or favor a scar with elasticity and mechanical strength.

The Present Study Has Two Limitations

First, the study was not randomized therefore unequal number of patients get enrolled in the groups.

Significantly high mean age; duration of ulcer; and wound size in were observed in conventional dressing patients because of the non-randomized nature of the study. Second, the sample size was less.

CONCLUSION

Medicated Collagen powder dressing increases the rate of wound healing as compared to conventional dressing. Further, it also reduces the follow up period and antibiotic use significantly as compared to conventional dressing.Probably, its spongy network contributes to exudate absorption and blocking of possible extensions of the wound, preventing bacterial growth that would delay the healing Process.

Day 1 Day 10 After Collagen Dressing

Day 1 Day 10 After Collagen Dressing

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